

Preliminary HCPM Review

**Presented to
FCC Common Carrier Bureau
Accounting Policy Division**

July 13, 1999

Agenda

- Customer Locations and Wire Center Boundaries
- Clustering and Density Zone Calculations
- Line Counts
- Inputs
 - Investment
 - Expense
- User Needs
- Commission Requirements
- Areas of Further Analysis

Customer Locations and Wire Center Boundaries

- Comparison of surrogate customer locations and actual wire center boundaries
- Comparison of actual and surrogate locations

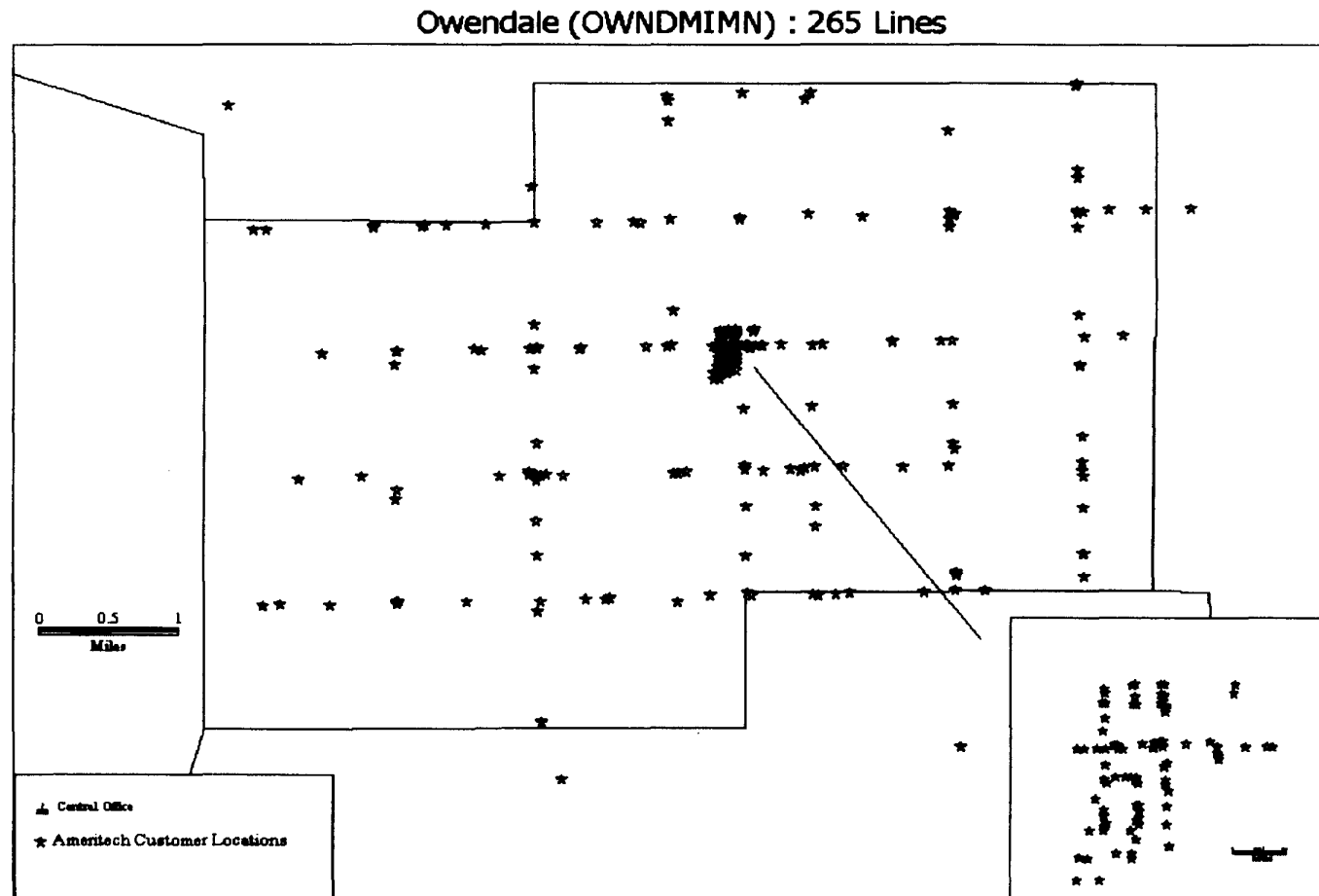
Owendale, Michigan Surrogate and Actual Locations

Owendale (OWNDMIMN) : 265 Lines



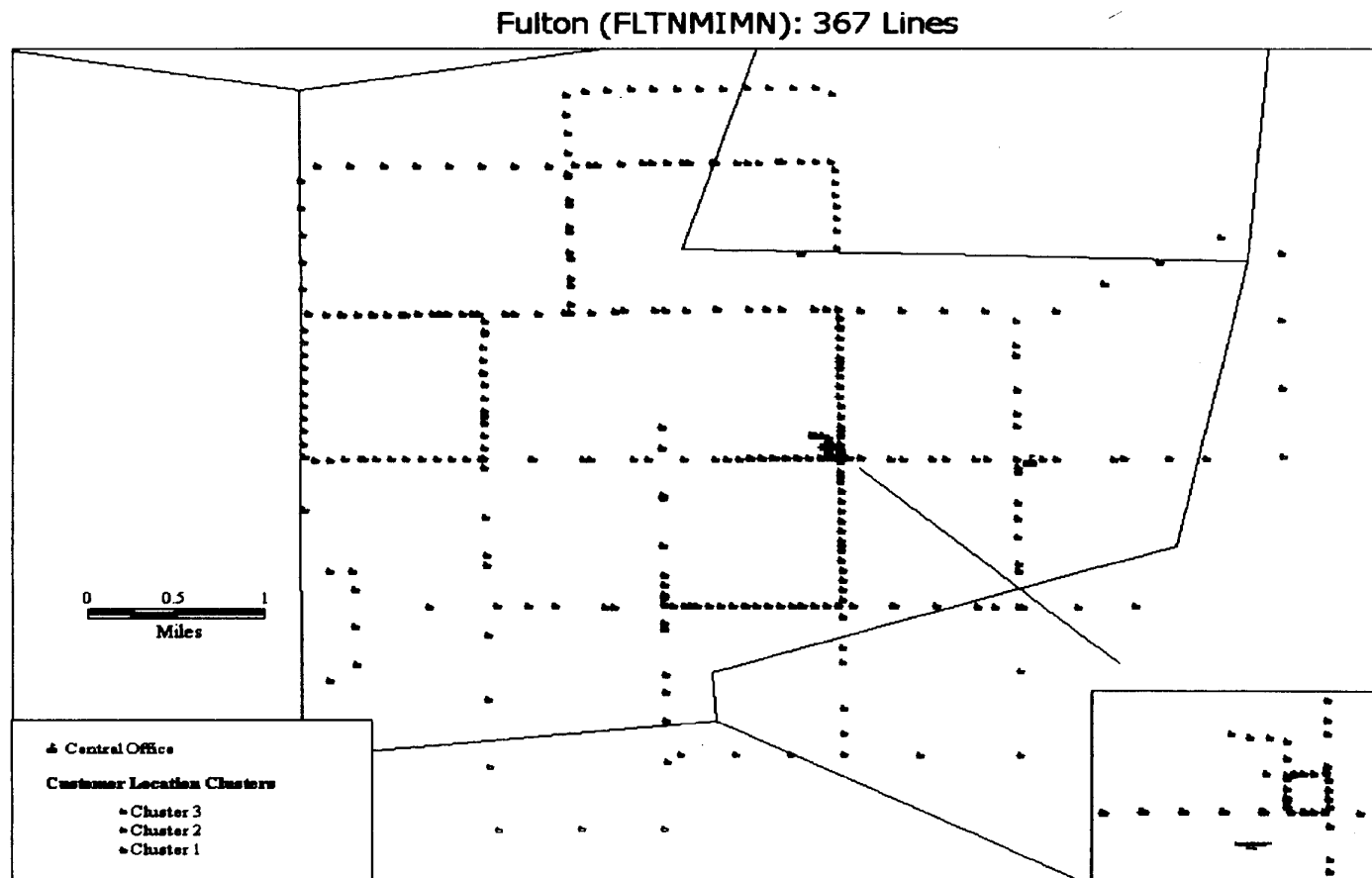
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Owendale, Michigan Surrogate and Actual Locations



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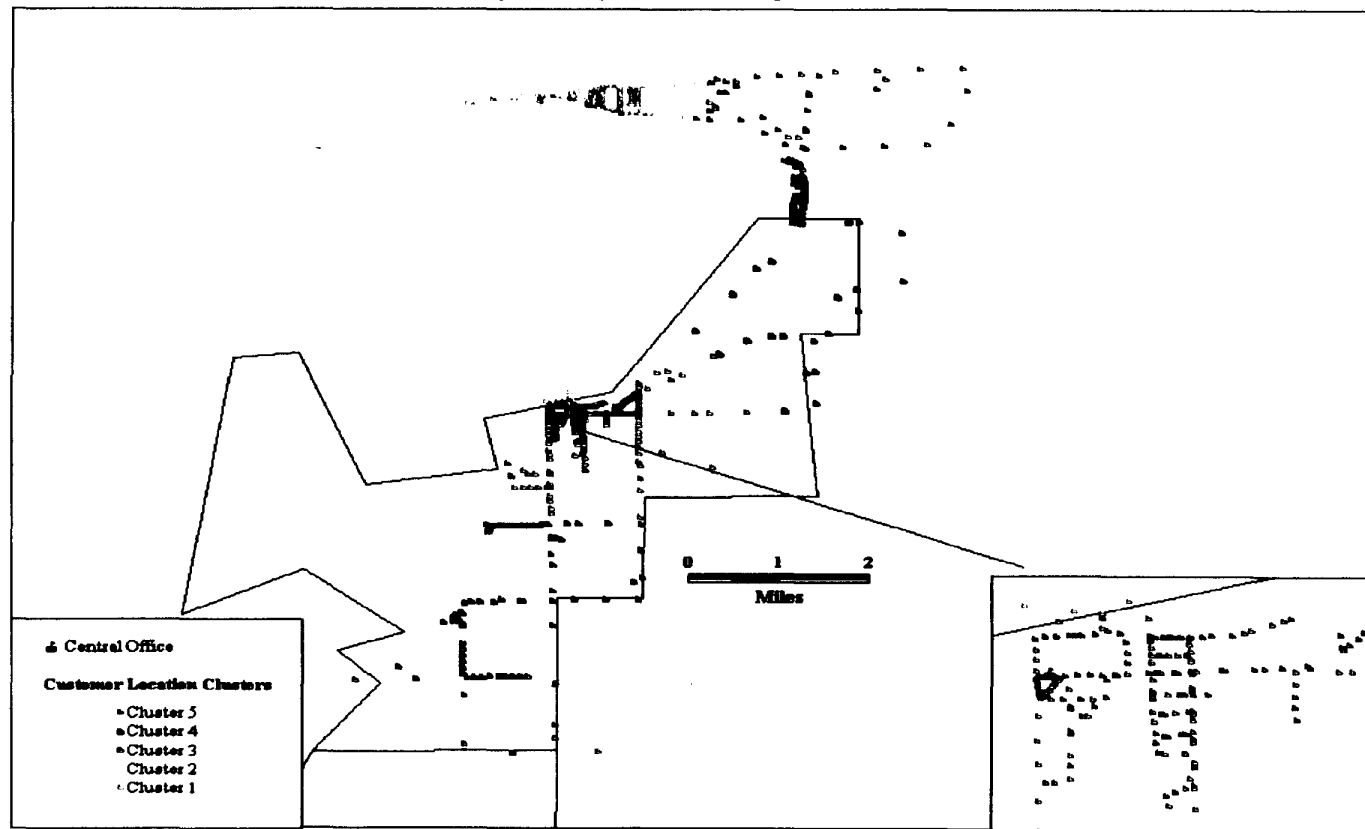
Fulton, Michigan Surrogate Locations



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Bay Port, Michigan Surrogate Locations

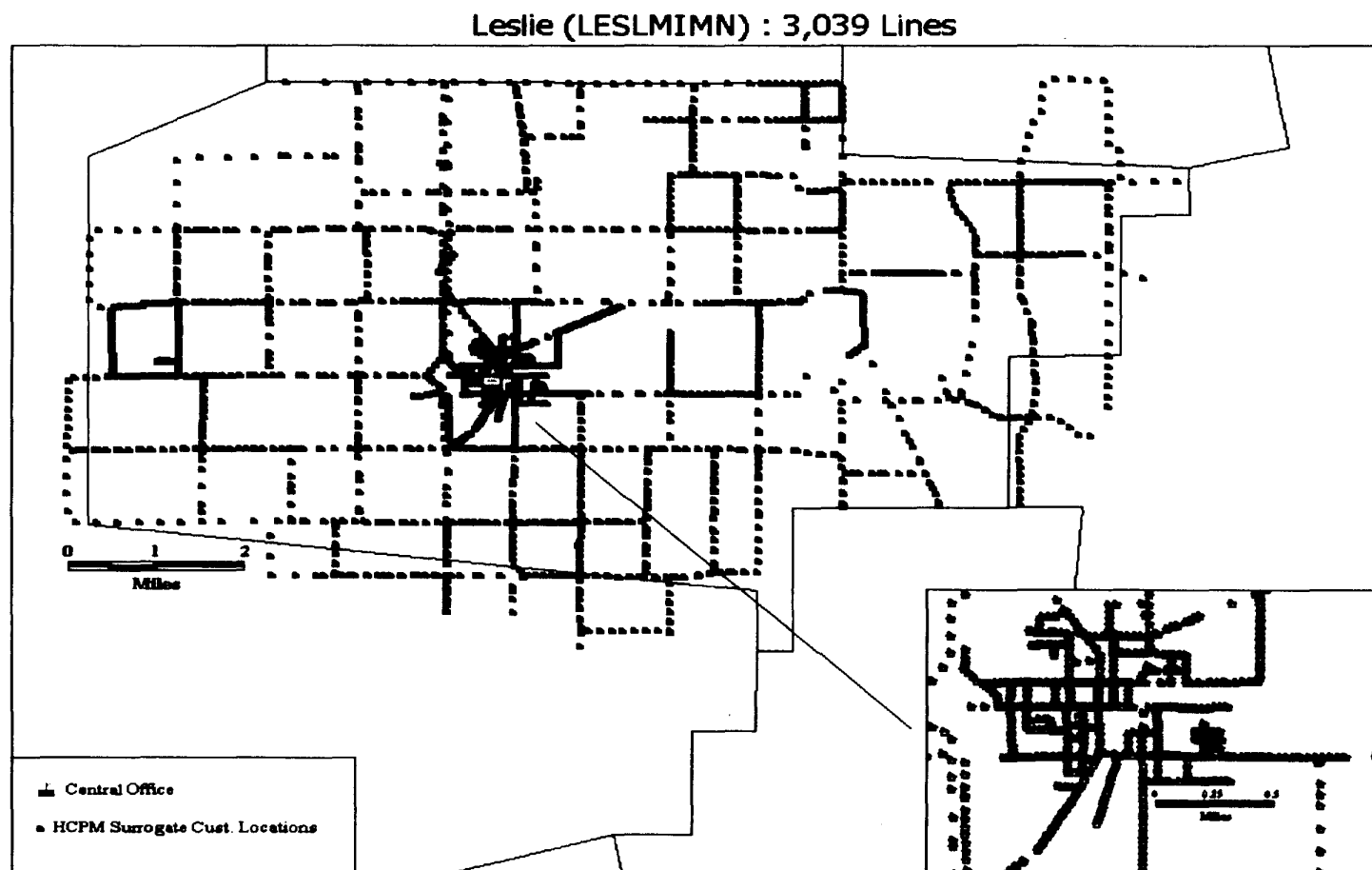
Bay Port (BYPTMIMN) : 454 Lines



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Leslie, Michigan

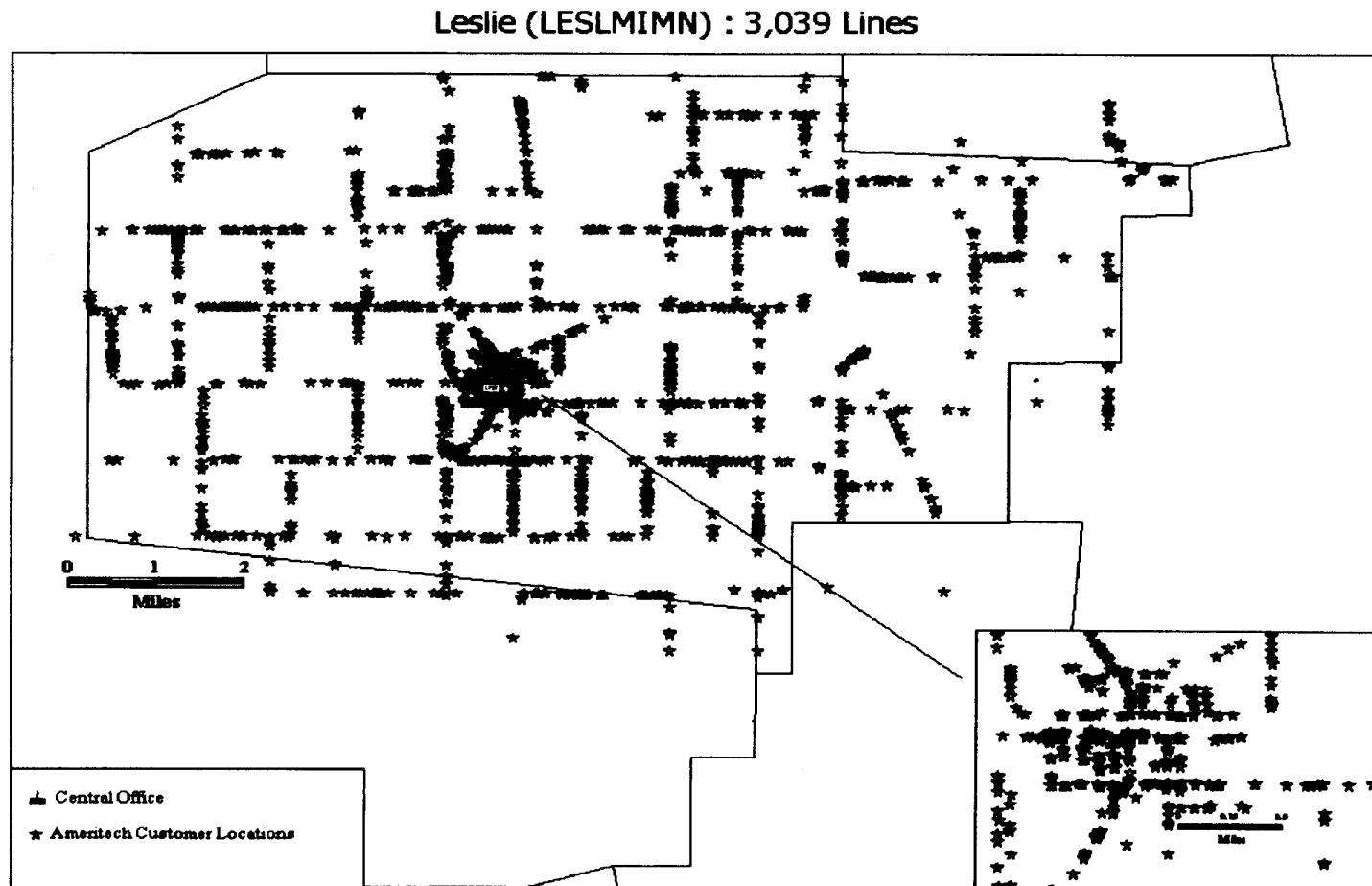
Surrogate and Actual Locations



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Leslie, Michigan

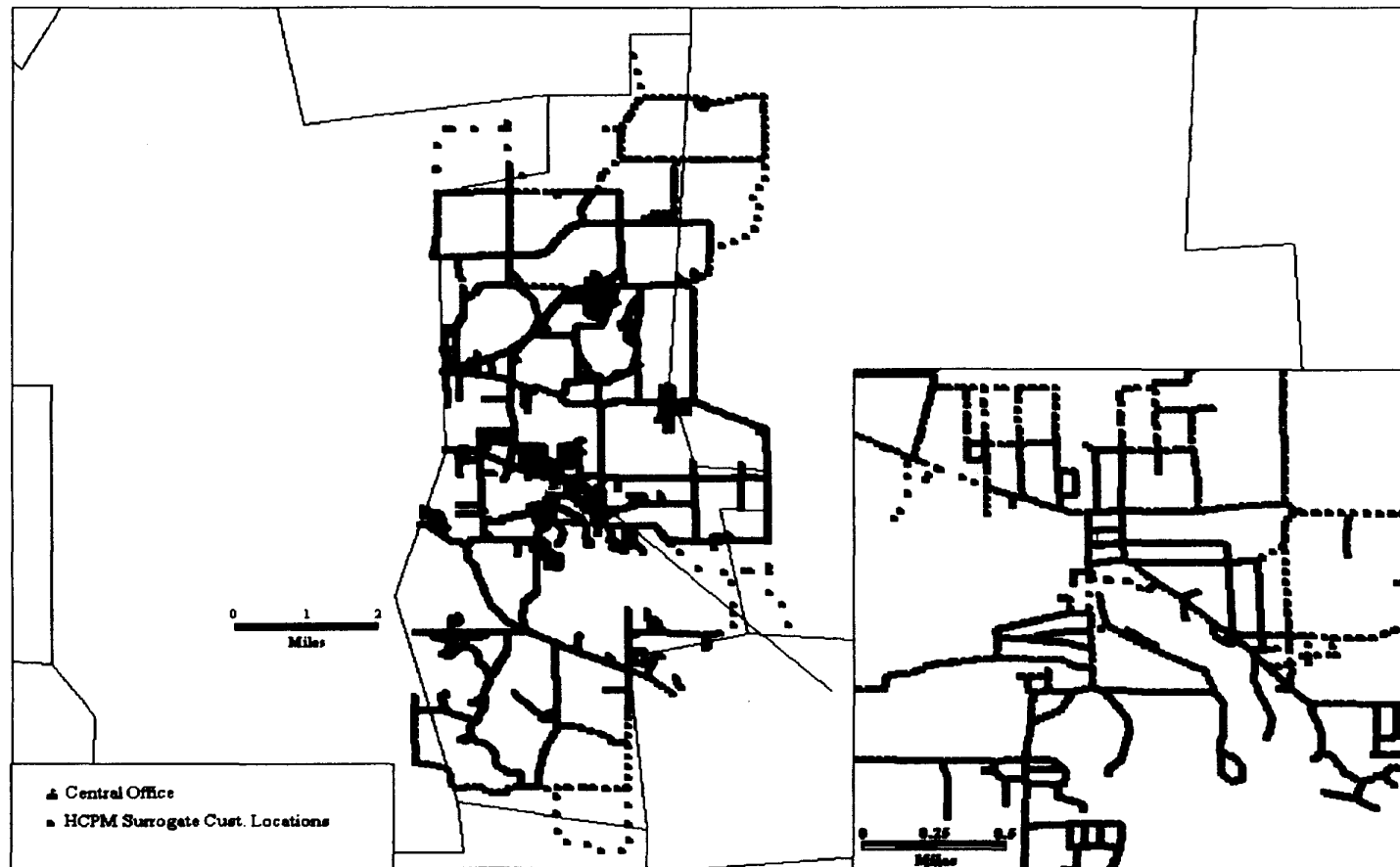
Surrogate and Actual Locations



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Michigan Center, Michigan Surrogate and Actual Locations

Michigan Center (MCHMIMN): 7,286 Lines



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Michigan Center, Michigan Surrogate and Actual Locations

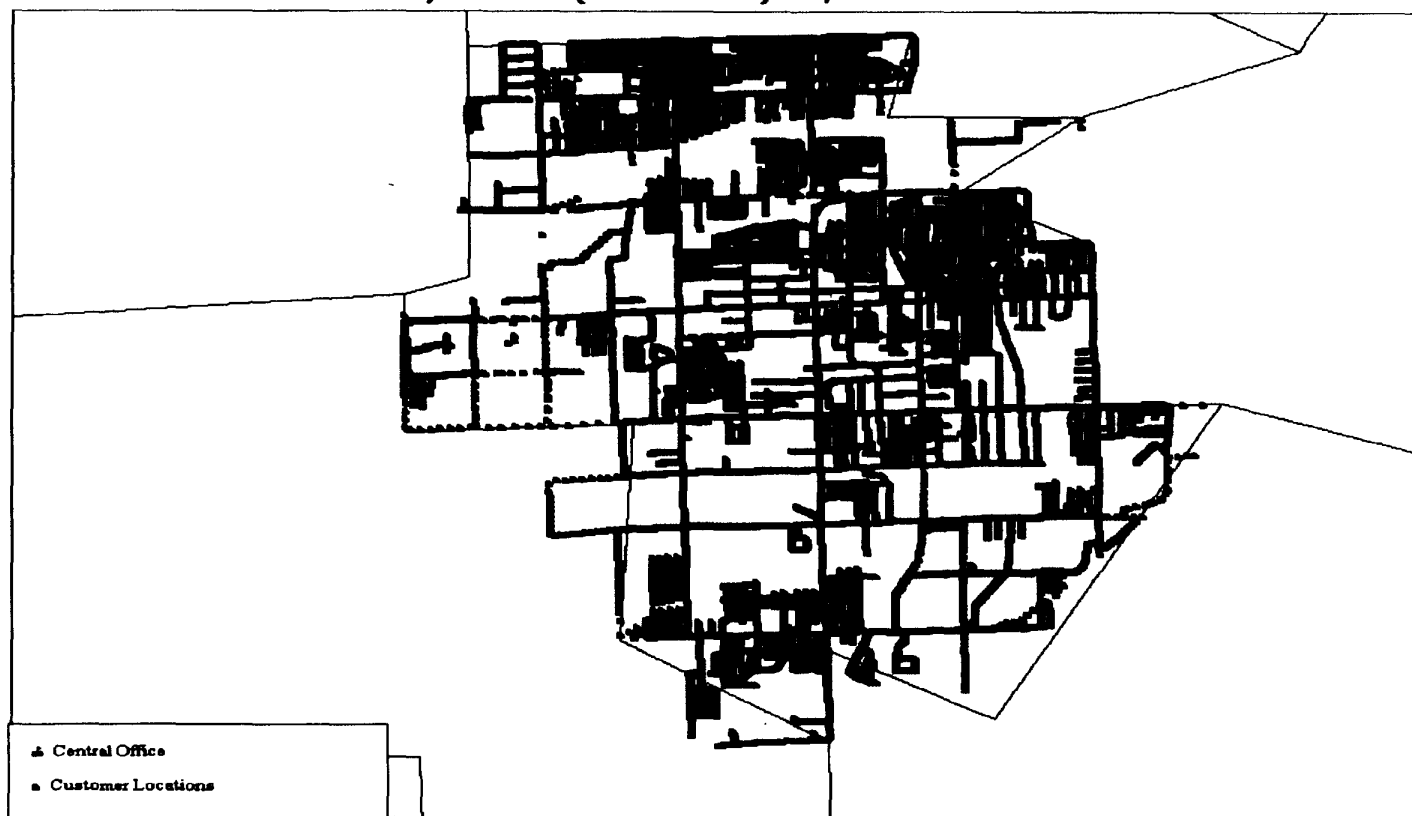
Michigan Center (MCHMIMN): 7,286 Lines



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Taylor Wick, Michigan Surrogate Locations

Taylor Wick (TAYLMIWK) 39,459 Lines



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Clustering and Density Zone Calculations

- Clustering: varying results by computer
 - For Minnesota, FCC output shows 3593 clusters; we get 3611 clusters
- HCPM density zones are derived from clusters
 - Single location clusters are in medium density zones

Line Counts

- Line counts: overall
 - Consistency with costs in model (1996 line counts vs. 1998 costs)
 - More accurate to use 1998 actual line counts
 - Tie out by wire center and type of line
- Special access lines
 - Consistency between costing and computing cost per line
 - Include intraLATA special access lines
- Open items
 - Users need ability to modify line counts by wire center and type

Inputs

■ Investment

- Sharing
- Cable cost
- Placement cost
- Plant mix

■ Expense

- General support
- Non-plant specific
- Economic lives

Investment Input Comparisons: Structure Sharing [[JCH to verify]]

Distribution and Feeder

| Density Zone | HCPM | | | MN BCPM | | |
|--------------|------|--------|--------|---------|--------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | 90% | 90% | 50% | 100% | 100% | 50% |
| 5-100 | 90% | 90% | 50% | 90% | 98% | 50% |
| 100-200 | 85% | 85% | 50% | 90% | 94% | 50% |
| 200-650 | 65% | 65% | 50% | 80% | 81% | 50% |
| 650-850 | 65% | 65% | 50% | 80% | 80% | 50% |
| 850-2550 | 65% | 65% | 50% | 80% | 80% | 50% |
| 2550-5000 | 55% | 55% | 35% | 80% | 80% | 50% |
| 5000-10000 | 55% | 55% | 35% | 80% | 80% | 50% |
| >10000 | 55% | 55% | 35% | 80% | 80% | 50% |

Investment Input Comparisons: Placement Costs (Normal Soil Conditions)

Distribution

| Density Group | HCPM | | | MN BCPM | | |
|---------------|---------|---------|--------|---------|---------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | \$1.72 | \$0.77 | \$1.51 | \$2.25 | \$1.47 | \$2.24 |
| 5-100 | \$1.72 | \$1.40 | \$1.51 | \$2.23 | \$1.82 | \$2.22 |
| 100-200 | \$1.97 | \$1.60 | \$1.98 | \$6.28 | \$4.46 | \$2.73 |
| 200-650 | \$2.49 | \$2.03 | \$1.98 | \$6.60 | \$5.74 | \$2.76 |
| 650-850 | \$2.84 | \$2.31 | \$2.27 | \$8.17 | \$8.26 | \$3.28 |
| 850-2550 | \$3.47 | \$2.83 | \$2.27 | \$8.26 | \$8.26 | \$3.28 |
| 2550-5000 | \$4.88 | \$3.97 | \$2.64 | \$8.71 | \$8.71 | \$3.83 |
| 5000-10,000 | \$7.96 | \$6.48 | \$2.72 | \$9.47 | \$9.47 | \$3.83 |
| 10,000+ | \$12.44 | \$10.13 | \$2.72 | \$10.41 | \$10.41 | \$3.83 |

Feeder

| Density Group | HCPM | | | MN BCPM | | |
|---------------|---------|---------|--------|---------|---------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | \$1.72 | \$0.77 | \$1.51 | \$2.25 | \$1.44 | \$2.24 |
| 5-100 | \$1.72 | \$1.40 | \$1.51 | \$2.48 | \$1.80 | \$2.22 |
| 100-200 | \$1.97 | \$1.60 | \$1.98 | \$3.97 | \$3.47 | \$2.73 |
| 200-650 | \$2.49 | \$2.03 | \$1.98 | \$5.32 | \$5.13 | \$2.76 |
| 650-850 | \$2.84 | \$2.31 | \$2.27 | \$6.85 | \$7.11 | \$3.28 |
| 850-2550 | \$3.47 | \$2.83 | \$2.27 | \$7.11 | \$7.11 | \$3.28 |
| 2550-5000 | \$4.88 | \$3.97 | \$2.64 | \$8.64 | \$8.64 | \$3.83 |
| 5000-10,000 | \$7.96 | \$6.48 | \$2.72 | \$9.72 | \$9.72 | \$3.83 |
| 10,000+ | \$12.44 | \$10.13 | \$2.72 | \$10.80 | \$10.80 | \$3.83 |

Investment Input Comparisons: Plant Mix

Distribution

| Density Group | HCPM | | | MN BCPM | | |
|---------------|-------|--------|--------|---------|--------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | 0.0% | 60.0% | 40.0% | 13.1% | 74.3% | 12.6% |
| 5-100 | 1.0% | 62.0% | 37.0% | 13.1% | 74.3% | 12.6% |
| 100-200 | 2.0% | 68.0% | 30.0% | 5.8% | 86.9% | 7.4% |
| 200-600 | 4.0% | 66.0% | 30.0% | 5.8% | 86.9% | 7.4% |
| 600-800 | 8.0% | 62.0% | 30.0% | 5.8% | 86.9% | 7.4% |
| 800-2550 | 20.0% | 50.0% | 30.0% | 3.3% | 91.1% | 5.6% |
| 2550-5000 | 40.0% | 30.0% | 30.0% | 20.3% | 75.4% | 4.3% |
| 5000-10,000 | 60.0% | 10.0% | 30.0% | 20.3% | 75.4% | 4.3% |
| 10,000+ | 90.0% | 0.0% | 10.0% | 69.6% | 30.4% | 0.0% |

Investment Input Comparisons: Plant Mix, con't

Copper Feeder

| Density Group | HCPM | | | MN BCPM | | |
|---------------|-------|--------|--------|---------|--------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | 5.0% | 50.0% | 45.0% | 0.5% | 97.3% | 2.2% |
| 5-100 | 5.0% | 50.0% | 45.0% | 3.6% | 94.2% | 2.2% |
| 100-200 | 5.0% | 50.0% | 45.0% | 12.3% | 86.9% | 0.9% |
| 200-600 | 20.0% | 40.0% | 40.0% | 12.3% | 86.9% | 0.9% |
| 600-800 | 40.0% | 30.0% | 30.0% | 12.3% | 86.9% | 0.9% |
| 800-2550 | 60.0% | 25.0% | 15.0% | 79.1% | 20.9% | 0.0% |
| 2550-5000 | 75.0% | 15.0% | 10.0% | 84.3% | 15.7% | 0.0% |
| 5000-10,000 | 90.0% | 5.0% | 5.0% | 84.3% | 15.7% | 0.0% |
| 10,000+ | 95.0% | 0.0% | 5.0% | 100.0% | 0.0% | 0.0% |

Fiber Feeder

| Density Group | HCPM | | | MN BCPM | | |
|---------------|-------|--------|--------|---------|--------|--------|
| | UG | Buried | Aerial | UG | Buried | Aerial |
| 0-5 | 5.0% | 50.0% | 45.0% | 0.5% | 97.3% | 2.2% |
| 5-100 | 5.0% | 50.0% | 45.0% | 3.6% | 94.2% | 2.2% |
| 100-200 | 5.0% | 50.0% | 45.0% | 12.3% | 86.9% | 0.9% |
| 200-600 | 20.0% | 40.0% | 40.0% | 12.3% | 86.9% | 0.9% |
| 600-800 | 40.0% | 30.0% | 30.0% | 12.3% | 86.9% | 0.9% |
| 800-2550 | 60.0% | 25.0% | 15.0% | 79.1% | 20.9% | 0.0% |
| 2550-5000 | 75.0% | 15.0% | 10.0% | 84.3% | 15.7% | 0.0% |
| 5000-10,000 | 90.0% | 5.0% | 5.0% | 84.3% | 15.7% | 0.0% |
| 10,000+ | 95.0% | 0.0% | 5.0% | 100.0% | 0.0% | 0.0% |

Sensitivity Analysis - Minnesota

| Modifications by Category | Loop Investment per Line | Monthly USF Loop Cost | Basic Local Service Cost | Local Service Cost Incremental Change |
|---------------------------------|-----------------------------|--------------------------|-----------------------------|---|
| HCPM with Default Inputs | \$656 | \$17.44 | \$20.54 | N/A |
| HCPM with BCPM Inputs | | | | |
| 1. Structure Sharing | \$682 | \$17.84 | \$20.94 | \$0.40 |
| 2. Placement Cost | \$892 | \$21.55 | \$24.64 | \$3.70 |
| 3. Plant Mix | \$978 | \$23.04 | \$26.14 | \$1.50 |

Discussion Items

- Cable cost regressions
- Placement cost regressions
- Plant mix

Expense Inputs

- Regressions and adjustments
- General support
- Application of expenses
- Economic lives

User Needs

- More complete documentation
- More complete users guide
- More complete explanation of inputs
- Ability to change line counts
- Ability to analyze model, e.g.:
 - Are the clustering algorithms doing what they are supposed to do?
 - Are the feeder and distribution algorithms doing what they are supposed to do?
 - Is sharing applied properly?
 - What is the effect of optimization routines?

Commission Requirements

- Ability to verify engineering design
- Ability to audit the model
- Ability to modify and model different inputs and assumptions
- Ability to review and analyze effect of inputs and outputs
- Ease of use

Areas of Further Analysis

- Comparison of HCPM clusters and actual distribution areas
- Optimization techniques
 - In clustering
 - In distribution and feeder development
- Line count “true-up”
- Switching
- Internal consistency
- External studies